

290. A method for the treatment of a particular volume of living tissue, the method comprising the steps of:

a) treating the living tissue with at least one photo-active molecular agent, wherein the particular volume of the living tissue retains at least a portion of the at least one photo-active molecular agent; and

b) treating the particular volume of the living tissue with light to promote a simultaneous two-photon excitation of at least one of the at least one photo-active molecular agent retained in the particular volume of the living tissue, wherein the at least one excited photo-active molecular agent becomes photo-activated in the particular volume of the living tissue.

291. The method of claim 290, wherein the light to promote a simultaneous two-photon excitation of the at least one photo-active molecular agent is a laser light.

292. The method of claim 291, wherein the laser light is a pulsed laser light.

293. The method of claim 290, wherein the light to promote a simultaneous two-photon excitation of the at least one photo-active molecular agent is a focused beam of light.

294. The method of claim 293, wherein the focused beam of light is focused laser light.

295. The method of claim 294, wherein the focused laser light is pulsed laser light.

296. The method of claim 290, wherein the at least one photo-active molecular agent is selected from the group consisting of haematoporphyrin derivatives, dihaematoporphyrin ether, porphyrins and porphyrin analogs, phthalocyanines and phthalocyanine analogs, rhodamine and rhodamine analogs, rhodamine B, rhodamine dyes, coumarin dyes, chlorophyll derivatives derived from bacteria and plants, stilbene dyes, hydrobenzoporphyrins, texaphyrin, furocourmarin, methoxsalen, bergapten, purpins, verdins, dimethyl POPOP, 1,3,1'3'-tetramethyl-2,2'-deoxypyrimide-6,6'-carbocyanine hydrogen

sulfate, 4-dicyanomethylene-2-methyl-6-p-dimethylaminostyryl-4H-pyran, and analogs thereof, and styryl dyes.

297. The method of claim 290, wherein the at least one photo-active molecular agent includes at least one photo-active molecular agent that is specific to a particular tissue within the particular volume of living tissue being treated.

298. The method of claim 297, wherein the at least one photo-active molecular agent includes a segment selected from the group consisting of antibodies, ligands, lipids, and encapsulating vehicles.

299. A method for the treatment of cancer in living tissue, the method comprising the steps of:

(a) treating the living tissue with at least one photo-active molecular agent, wherein the cancer in the living tissue retains at least a portion of the at least one photo-active molecular agent; and

(b) treating the living tissue with light to promote a simultaneous two-photon excitation of at least one of the at least one photo-active molecular agent retained in the cancer in the living tissue, wherein the at least one photo-active molecular agent becomes photo-activated in the cancer in the living tissue.

300. The method of claim 299, wherein the light to promote a simultaneous two-photon excitation of the at least one photo-active molecular agent is a laser light.

301. The method of claim 300, wherein the laser light is a pulsed laser light.

302. The method of claim 299, wherein the light to promote a simultaneous two-photon excitation of the at least one photo-active molecular agent is a focused beam of light.

303. The method of claim 302, wherein the focused beam of light is a focused laser light.

304. The method of claim 303, wherein the focused laser light is a pulsed laser light.

305. The method of claim 299, wherein the at least one photo-active molecular agent is selected from the group consisting of haematoporphyrin derivatives, dihematoporphyrin ether, porphyrins and porphyrin analogs, phthalocyanines and phthalocyanine analogs, rhodamine and rhodamine analogs, rhodamine B, rhodamine dyes, coumarin dyes, chlorophyll derivatives derived from bacteria and plants, stilbene dyes, hydrobenzoporphyrins, texaphyrin, furocourmarin, methoxsalen, bergapten, purpins, verdins, dimethyl POPOP, 1,3,1'3'-tetramethyl-2,2'-deoxypyrimide-6,6'-carbocyanine hydrogen sulfate, 4-dicyanomethylene-2-methyl-6-p-dimethylaminostyryl-4H-pyran and analogs thereof, and styryl dyes.

306. The method of claim 299, wherein the at least one photo-active molecular agent includes at least one photo-active molecular agent that is specific to a particular tissue within the particular volume of living tissue being treated.

307. The method of claim 306, wherein the at least one photo-active molecular agent includes a segment selected from the group consisting of antibodies, ligands, lipids, and encapsulating vehicles.

308. The method of claim 290, wherein said treating the particular volume of the living tissue includes focusing a beam of light so that a focal point of the light beam occurs at a position located between a surface of the tissue and a point substantially beyond the tissue surface, whereby said treating the particular volume of the living tissue may extend to penetrate deep within the tissue.

309. The method of claim 308, wherein said treating the living tissue with light includes operating a laser to produce a pulsed output having a sub-nanosecond pulse duration.

310. The method of claim 308, wherein the laser produces near-infrared light.

311. A method for medical treatment of a particular volume of tissue comprising the steps of:

introducing a photo-active molecular agent into a tissue, said agent being selected to be absorbed and accumulated in the tissue, said agent being susceptible of two-photon excitation (TPE);

allowing said agent to accumulate in specific tissue;

directing light to specific regions of interest within the tissue, including regions substantially below a tissue surface, said light being selected in frequency and energy to penetrate the tissue and to promote TPE substantially only at a focused region;

controlling the location of a focused region over a range of depths within said tissue; and

using TPE to photoactivate said agent over said range of depth within the tissue, thereby producing photoactivated agents at the focused region.

312. The method of claim 311, wherein said directing light includes generating near infra-red light with a pulsed laser operating at short pulse widths and a high pulse repetition rate, and focusing said laser into said tissue.

313. A method for the treatment of a particular volume of cancerous living tissue, the tissue including at least one photo-active molecular agent, the method comprising:

treating said particular volume with light to promote simultaneous two-photon excitation of at least one of said at least one molecular agent so that said at least one excited molecular agent becomes photoactivated in said particular volume at a controllable position.

314. The method of claim 313, wherein said at least one excited molecular agent becomes photoactivated in said particular volume at a controllable position substantially beyond a tissue surface.

315. The method of claim 313, further including varying a focal length position of said light within said tissue, thereby to photoactivate said at least one molecular agent along controlled positions between said tissue surface and a position located substantially beyond said tissue surface.

316. The method of claim 313, wherein said treating includes directing a laser light to said particular volume.

317. The method of claim 316, wherein said treating includes directing a pulsed laser light to said particular volume.

318. The method of claim 317, wherein said laser is pulsed to produce sub-nanosecond duration pulses.

319. The method of claim 313 including operating a light source to produce near-infrared light.

320. The method of claim 317 including operating a light source to produce near-infrared light.

321. A method for the medical treatment of a particular volume of tissue, wherein the tissue includes at least one photo-active molecular agent, the method comprising the steps of:

directing light to specific regions of interest within the tissue, including regions substantially below a tissue surface, said light being selected to penetrate the tissue and to promote two photon excitation (TPE) substantially only at a focused region;

controlling the location of said focused region over a range of depths within said tissue; and

using TPE, photoactivating at least one of said at least one molecular agent over said range of depths within said tissue, thereby producing at least one photo-activated agent substantially only at the focused region.

322. The method of claim 321, wherein said directing includes directing a laser light to said particular volume.

323. The method of claim 322, wherein said directing includes directing a pulsed laser light to said particular volume.

B/ 37 CFR 1.663